Structures, Processes, and Responses in Animals

6-3 The student will demonstrate an understanding of structures, processes, and responses in animals that allow them to survive and reproduce. (Life Science)

6.3.5 Illustrate animal behavioral responses (including hibernation, migration, defense, and courtship) to environmental stimuli.
Taxonomy level: 2.2-B Understand Conceptual Knowledge

Previous/Future knowledge: Students have previously studied hibernation and animal defense in 3rd grade (3-2.2). In 4th grade (4-2.5) students explained how an organism's behavior is related to its environment.

It is essential for students to know that a complex set of responses to stimuli is called *behavior*. *Behavioral responses* refer to how animals cope with changes in their environments. Animals may respond to environmental stimuli through behaviors that include hibernation, migration, defense, and courtship.

Hibernation
- As a result of cold, winter weather (stimulus) some animals will hibernate.
- *Hibernation* is a state of greatly reduced body activity, used to conserve food stored in the body.
- Some animals hibernate for part or all of the winter.
- The animal's body temperature drops, its heartbeat and breathing slow down, and it uses very little energy.
- Examples of hibernating animals may be ants, snakes, black bears, beavers, and ground squirrels.

Migration
- *Migration* is the movement of animals from one place to another in response to seasonal changes. They travel to other places where food is available.
- Migrating animals usually use the same routes year after year.
- The cycle is controlled by changes in the amount of daylight and the weather.
- Examples of animals that migrate are monarch butterflies, orcas, caribou, and ducks.

Defense
- Defense mechanisms vary with different types of animals. Some examples are:
  - *Camouflage*: Some animals have protective coloration to survive changes in its environment. Some animals develop their camouflage in response to the weather; for example the artic fox and snowshoe hare. They develop a white coat for the winter to blend in with the snow and a gray coat in the summer to blend in with the forest. Chameleons and other lizards change colors to blend into the environment to avoid predators.
  - *Smells*: Skunks use an offensive odor in response to fear. The skunk turns the predator's sense of smell against it by issuing a stream of oily, foul smelling musk.
  - *Stingers*: Wasps and bees use a stinger for protection when frightened or threatened.
  - *Ejection*: The black ink cloud of an octopus is a defense mechanism because it gives the animal a chance to escape from a predator. When the horned lizard gets really scared, it shoots blood out of its eyes allowing it time to escape.

- *Mimicry*: When a weaker animal copies stronger animals' characteristics to warn off predators. Some animals may look like another more poisonous or dangerous animal that give it protection, such as a "false" coral snake or hawk moth caterpillar that looks like a snake. Certain moths have markings that look like eyes and some flower flies resemble black and yellow wasps that have a powerful sting and use this disguise to ward off predators.
- *Grouping*: This social behavior occurs when certain animals travel together in groups to protect individuals within the group or to fool a predator into thinking the group is one large organism. Examples may include herds (buffalo, zebra, cattle), packs (wolves), or schools of fish.

Courtship

- Courtship in animals is usually a behavioral process whereby adults of a species try to attract a potential mate.
- Courtship behaviors ensure that males and females of the same species recognize each other.
- Environmental stimuli, such as seasonal changes, will stimulate courtship.
- Often sensory cues (for example, chemical odor cues, sounds, or color) will serve as courtship attractants in animals.

It is not essential for students to know the chemical mechanisms for the behaviors studied here, technologies for tracking the migration of animals, or other types of animal behaviors

Assessment Guidelines:
The objective of this indicator is to *illustrate* animal behavioral responses to environmental stimuli; therefore, the primary focus of assessment should be to give examples of animal behavioral responses (including hibernation, migration, defense, and courtship) using pictures, diagrams, or words. However, appropriate assessments should also require students to *recall* information about behavioral responses; *explain* how environmental stimuli result in animal behaviors; or *summarize* animal behaviors that result from environmental stimuli.